

# Heterojunction Bipolar Transistor Power Amplifiers for Long-Range X-band Communications, Phase I

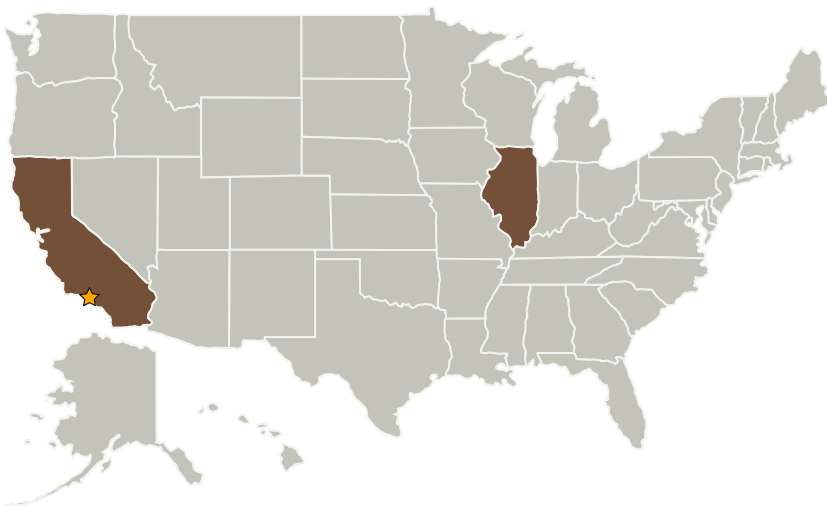
Completed Technology Project (2006 - 2006)



## Project Introduction

In this SBIR Phase I project, Vega Wave Systems, Inc. will develop and demonstrate a novel InGaP-GaAs heterojunction bipolar transistor power amplifier for long-range X-band communications. The Phase I objective is to design and fabricate a new type of heterojunction bipolar transistor in order to achieve high device performance for power amplifiers (PAs). In addition, monolithic power combiners suitable for combining the output power of several HBTs will be designed and simulated. The transistor design is expected to result in a new approach capable of achieving high performance in an inherently low-cost device process. Prototype InGaP heterojunction bipolar transistors that have been optimized for communications applications at X-band frequencies will be designed, fabricated and delivered in Phase I. The devices will be characterized and modeling parameters will be extracted from the characterization results. Preliminary power amplifier and power combiner designs will be evaluated using the models obtained for the transistors. In Phase II the technology will be optimized for performance and extended to higher levels of integration by combining the outputs of several power transistors to deliver a monolithically-integrated amplifier that can achieve power output levels in excess of 10 watts.

## Primary U.S. Work Locations and Key Partners



Heterojunction Bipolar Transistor Power Amplifiers for Long-Range X-band Communications, Phase I

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Heterojunction Bipolar Transistor Power Amplifiers for Long-Range X-band Communications, Phase I

Completed Technology Project (2006 - 2006)



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Vega Wave Systems, Inc.	Supporting Organization	Industry	West Chicago, Illinois

Primary U.S. Work Locations	
California	Illinois

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.2 Power-Efficiency